Math 3C Fall 2014

Pre-lecture 10-2 Due: Beginning of lecture-Wednesday, December 10.

This is to be done on your own paper. Please write your name (last name first) on the top right corner along with your discussion section number (B02, B03 etc) and "pre-lecture [number]" (in this case "pre-lecture 10-2").

This will be graded on effort and thoughtfulness, not on correctness. With that said, do not feel obligated to write more than necessary. This is intended for you to work on your own.

All units on this assignment will be in radians, not degrees.

1. Draw the graph (either sketch it or get help from a calculator) of

$$f(x) = \sin(x)$$

on the coordinate plane. The $x-$axis should go from -4π to 4π in increments of $\pi/2$ and the $y-$axis should go from -3 to 3. The domain is all real numbers, though our graph will only show the x values in $[-4\pi, 4\pi]$.

   (a) What is the range of $f(x)$?

2. Recall that if c is a positive number and $g(x)$ is a function, then the graph of $cg(x)$ is the graph of $f(x)$ stretched vertically by a factor of c.

   (a) On a new coordinate plane, graph the function

$$h_1(x) = 2\sin(x)$$

   What does it look like compared to the graph of $f(x) = \sin(x)$?

   (b) What is the range of $h_1(x)$?

3. Recall that if a is a positive number and $g(x)$ is a function, then the graph of $g(x) + a$ is the graph of $g(x)$ shifted vertically upwards by a units.

   (a) On a new coordinate place, graph the function

$$h_2(x) = \sin(x) + 2$$

   What does it look like compared to the graph of $f(x) = \sin(x)$?

   (b) What is the range of $h_2(x)$?

4. Recall that if a is a positive number and $g(x)$ is a function, then the graph of $g(x - a)$ is the graph of $g(x)$ shifted horizontally to the right by a units.

   (a) On a new coordinate plane, graph the function

$$h_3(x) = \sin\left(x - \frac{\pi}{2}\right)$$

   What does it look like compared to the graph of $f(x) = \sin(x)$?

   (b) Does the range of $h_3(x)$ change compared to $f(x)$?

5. Now on a new coordinate plane, graph the function

$$h_4(x) = \sin(x - 2\pi)$$

   (a) What does the graph of $h_4(x)$ it look like compared to the graph of $f(x) = \sin(x)$?

   (b) Why is this the case?